#4621
10/762,198

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(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number (Emperor's year): 10186260 A

(43) Date of publication of application: 14 . 07 . 98

(51) Int. Cl G02B 26/10
G01J 1/04
// G01V 8/14

(21) Application number: 08347171

(22) Date of filing: 26 . 12 . 96

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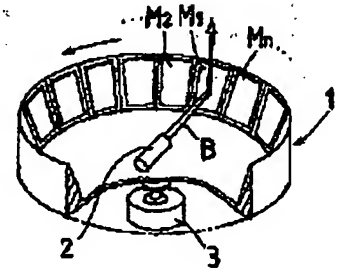
(54) SCANNING OPTICAL DEVICE AND INFRARED DETECTION DEVICE

(57) Abstract:

PROBLEM TO BE SOLVED: To eliminate need for securing the arranging space of a light source and the like outside a cylindrical body constituted so that plural mirrors are arranged at the inside circumferential surface and to make a device compact as a whole by executing a light beam scanning action by rotating the cylindrical body.

SOLUTION: The cylindrical body 1 is processed to be such a shape that the inside circumferential surface is inclined with respect to a cylindrical shaft. The plural mirrors M1, M2, ...Mn are arranged along the inside circumferential surface. The reflection surfaces of the mirrors M1, M2, ...Mn are formed so that the elevation angles and the azimuth angles thereof mutually become different by a prescribed angle each. The light source 2 is arranged on the inside of the cylindrical body 1. Then, the mirrors M1, M2, ...Mn are irradiated with the light beam B from the light source 2. Besides, the cylindrical body 1 is rotated in one direction at a constant speed with the cylindrical shaft as a center by a motor 3. By the rotation of the cylindrical body 1, the mirrors M1, M2, ...Mn are successively positioned at the advancing path of the beam B from the light source 2. Then, the beam B is used for the scanning action in a two-dimensional direction by being reflected on the respective mirrors.



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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the infrared detection equipment used for the scan optical equipment used for the optical system of the lighting for a bar code reader, a laser scanner, a laser beam printer, and amusement facilities etc., body detection, etc.
[0002]
[Description of the Prior Art] As optical system which scans a light beam in the shape of two-dimensional, a galvanomirror (oscillating mirror) and a polygon mirror are mentioned. The polygon mirror is widely used for the bar code reader, the laser beam printer, etc. among these scan optical system, and since a galvanomirror can scan the configuration of arbitration by control of an axis-of-rotation drive system, it is used also for fields, such as lighting for amusement using a laser beam.
[0003] On the other hand, as infrared detection equipment used for body detection etc., there is equipment which detects the infrared light out of detection area by the infrared sensor, and measures two-dimensional luminous-intensity distribution.
[0004]
[Problem(s) to be Solved by the Invention] By the way, since a biaxial drive system is needed when performing a two-dimensional scan in a galvanomirror, there is a problem of also attaching cost highly, the top where the whole optical system is large-scale. And since it is necessary to take the biaxial synchronization of a mirror correctly and to control the scan angle of a beam to a precision in order to obtain the target beam scan, the motor and controller of high degree of accuracy are needed.
[0005] Moreover, it is necessary to arrange the light source or an electric eye on the outside of a rotation polyhedron, and in the case of a polygon mirror, for this reason, the space which arranges the light source etc. other than a rotation polyhedron is needed, and there is a problem that optical system surely becomes large.
[0006] When the thing of the structure of on the other hand preparing an infrared sensor, a field lens, etc. conventionally as infrared detection equipment which detects the location of the body etc. corresponding to the number of partitions of detection area is common and the number of partitions of detection area increases for this reason, the number of the sensor needed in connection with it and a lens also increases, and there is a problem that costs become high.
[0007] In addition, although the method of using a polygon mirror for the scan in detection area is also considered in this kind of infrared detection equipment Since it is usually necessary to arrange a mirror peripheral face towards the direction where detection light advances in the case of a polygon mirror, in order to install in a ceiling etc. as an object for body detection the mirror axis of rotation is leveled and a mirror is arranged with a perpendicular posture -- if it kicks, it will not become, but for this reason, the height size of equipment becomes quite large, and it becomes less practical
[0008] This invention was made in view of the above actual condition, and the structure and control of a drive system aim [this invention] at offer of scan optical equipment easy and small moreover, and offer of the cheap infrared detection equipment which can measure two-dimensional luminous-intensity distribution on the basis of an easy configuration.
[0009]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, scan optical equipment of this invention An internal surface is met so that it may illustrate to drawing 1 , and they are two or more mirrors M1 and M2, ..., Mn. The cylinder object 1 arranged so that it may be suitable in the direction in which each of those reflectors differ mutually, A rolling mechanism which supports this cylinder object 1 and rotates a cylinder shaft as a center (for example, motor 3), They are mirrors M1 and M2, ..., or Mn about light beam B from the light source 2 which was equipped with the light source 2 arranged inside the cylinder object 1, was made to rotate the cylinder object 1 of the above-mentioned structure, and has been arranged inside the cylinder object 1. By glaring It characterizes by having constituted so that light beam B might be scanned in the shape of two-dimensional.
[0010] Thus, by arranging a mirror for a scan to inner skin of the cylinder object 1, it becomes unnecessary to provide for an outside of body of revolution a space which arranges the light source etc., and only the part can achieve a miniaturization of optical equipment. Moreover, when a dimension of optical equipment is made into the same magnitude as scan optical system using the conventional general polygon mirror, it enables it only for a part equivalent to a space which arranges the light source etc. to be able to take a large diameter of the cylinder object 1, and to make [many] the number of pages of reflectors compared with a case where a polygon mirror is used.
[0011] Here, in scan optical equipment of this invention, it may change to the above-mentioned light source 2, an electric eye may be arranged inside the cylinder object 1, and it becomes possible to measure two-dimensional luminous-intensity

distribution in this case. Moreover, what is necessary is just to station both sides of the electric eye for the light sources (semiconductor laser etc.) inside the cylinder object 1, in applying scan optical equipment of this invention to a bar code reader etc.

[0012] Infrared detection equipment of this invention arranges an infrared sensor 12 inside the cylinder object 11, and the feature is in a place constituted so that intensity distribution of infrared light from the target detection area (refer to drawing 6) might be measured so that it may have an above-mentioned cylinder object and an above-mentioned rolling mechanism of structure and may illustrate to drawing 3 .

[0013]

[Embodiment of the Invention] The gestalt of operation of this invention is hereafter explained based on a drawing. Drawing 1 is the perspective diagram showing typically the gestalt of operation of the scan optical equipment of this invention.

[0014] The scan optical equipment of this example is mainly constituted by the cylinder object 1, the light source 2, and the motor 3.

(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号

特開平10－186260

(43)公開日　平成10年(1998)7月14日

(51)Int.Cl.[6]	識別記号	FI	
G02B 26/10	101	G02B 26/10	101
G01J 1/04		G01J 1/04	D
// G01V 8/14		G01V 9/04	B

審査請求　未請求　請求項の数2　OL　（全4頁）

(21)出願番号　特願平8－347171

(22)出願日　平成8年(1996)12月26日

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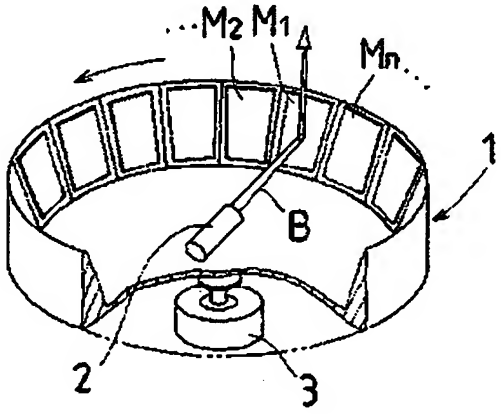
(54)【発明の名称】　走査光学装置及び赤外検出装置

(57)【要約】
【課題】　駆動系の構造・制御が簡単でしかも小型な走査光学装置を提供する。また2次元の光度分布を簡単な構成のもとに測定できる安価な赤外検出装置の提供を目的とする。
【解決手段】　内壁面に沿って複数枚のミラーM1,M2,・・・・,Mnが、その各反射面が互いに異なる方向に向くように配置されてなる円筒体1の内部に、光源2等を配置し、その円筒体1を回転することによって光ビームの走査を行う。また、そのような円筒体と赤外線センサを用いることで、簡単な構成のともに、赤外光の2次元強度分布が得らるようにする。



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【特許請求の範囲】

【請求項１】　内壁面に沿って複数枚のミラーが、その各反射面が互いに異なる方向に向くように配置された円筒体と、この円筒体を支持しかつ円筒軸を中心として回転する回転機構を備え、その円筒体の内部に、上記ミラーに光を照射する光源またはミラーからの反射光を受光する受光器のいずれか一方もしくは双方が配置されてなる走査光学装置。

【請求項２】　請求項１に記載の円筒体及び回転機構と、その円筒体の内部に配置された赤外線センサを備え、上記円筒体が回転状態のときに各ミラーが臨む検知エリア内からの赤外光を上記センサで検出するように構成されてなる赤外検出装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、例えばバーコードリーダ、レーザスキャナ、レーザプリンタ、娯楽施設用照明などの光学系に用いられる走査光学装置、及び人体検知などに利用される赤外検出装置に関する。

【０００２】

【従来の技術】光ビームを２次元状に走査する光学系としては、ガルバノミラー（振動ミラー）及びポリゴンミラーが挙げられる。これら走査光学系のうち、ポリゴンミラーはバーコードリーダやレーザプリンタなどに広く利用されており、また、ガルバノミラーは、回転軸駆動系の制御により任意の形状の走査を行うこと可能であることから、レーザビームを用いた娯楽用照明などの分野にも利用されている。

【０００３】一方、人体検知等に利用される赤外検出装置としては、検知エリア内からの赤外光を赤外線センサで検出して２次元の光度分布を測定する装置がある。

【０００４】

【発明が解決しようとする課題】ところで、ガルバノミラーにおいて２次元走査を行う場合、２軸の駆動系が必要となるので、光学系全体が大掛かりなる上、コストも高くつくという問題がある。しかも、目的とするビーム走査を得るには、ミラーの２軸の同期を正確にとってビームの走査角度を精密に制御する必要があるので、高精度のモータとコントローラが必要になる。

【０００５】また、ポリゴンミラーの場合、回転多面体の外側に光源または受光器を配置する必要があり、このため回転多面体のほかに、光源等を配置するスペースが必要となり光学系がどうしても大きくなるという問題がある。

【０００６】一方、人体等の位置を検出する赤外検出装置としては、従来、検知エリアの分割数に対応して赤外線センサ及び視野レンズ等を設けるといった構造のものが一般的で、このため検知エリアの分割数が多くなると、それに伴って必要とされるセンサとレンズの個数も多くなり費用が高くなるという問題がある。

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【０００７】なお、この種の赤外検出装置において、検知エリア内の走査にポリゴンミラーを用いるという方法も考えられるが、ポリゴンミラーの場合、通常、ミラー外周面を検出光が進行してくる方向に向けて配置する必要があることから、人体検知用として天井等に設置するには、ミラー回転軸を水平としてミラーを垂直姿勢で配置しなければならず、このため装置の高さ寸法がかなり大きくなってしまい、実用的でなくなる。

【０００８】本発明は、以上のような実情に鑑みてなされたもので、駆動系の構造・制御が簡単でしかも小型な走査光学装置の提供と、２次元の光度分布を簡単な構成のもとに測定できる安価な赤外検出装置の提供を目的とする。

【０００９】

【課題を解決するための手段】上記の目的を達成するため、本発明の走査光学装置は、図１に例示するように、内壁面に沿って複数枚のミラーM1,M2,‥‥, Mnが、その各反射面が互いに異なる方向に向くように配置された円筒体１と、この円筒体１を支持しかつ円筒軸を中心として回転する回転機構（例えばモータ３）と、円筒体１の内部に配置された光源２を備え、上記した構造の円筒体１を回転させ、円筒体１の内部に配置した光源２からの光ビームBをミラーM1,M2,‥‥またはMnに照射することにより、光ビームBを２次元状に走査するように構成したことによって特徴づけられる。

【００１０】このように、円筒体１の内周面に走査用のミラーを配置することで、回転体の外側に光源等を配置するスペースを設ける必要がなくなり、その分だけ、光学装置の小型化をはかることができる。また、光学装置の外形寸法を、従来の一般的なポリゴンミラーを用いた走査光学系と同じ大きさとした場合、光源等を配置するスペースに相当する分だけ円筒体１の直径を大きくとることができ、反射面の面数をポリゴンミラーを用いた場合に比べて多くすることが可能になる。

【００１１】ここで、本発明の走査光学装置において、上記した光源２に替えて、受光器を円筒体１の内部に配置してもよく、この場合、２次元の光度分布を測定することが可能になる。また、本発明の走査光学装置を、バーコードリーダなどに適用する場合には、光源（半導体レーザ等）をその受光器の双方を円筒体１の内部に配置すればよい。

【００１２】本発明の赤外検出装置は、上記した構造の円筒体と回転機構を備え、図３に例示するように、円筒体１１の内部に赤外線センサ１２を配置して、対象とする検知エリア（図６参照）からの赤外光の強度分布を測定するように構成したところに特徴がある。

【００１３】

【発明の実施の形態】本発明の実施の形態を、以下、図面に基づいて説明する。図１は本発明の走査光学装置の実施の形態を模式的に示す斜視図である。

【００１４】この例の走査光学装置は、円筒体１、光源２及びモータ３によって主に構成されている。円筒体１は、内周面が円筒軸に対して斜めに傾いた形状に加工されており、その内周面に沿って複数枚のミラーM1,M2,・・・・，Mn が設けられている。この各ミラーM1,M2,・・・，Mn の反射面は、図２に示す仰角α及び方位角φが、それぞれ互いに所定角度づつ異なるように形成されている。

【００１５】光源２は円筒体１の内部に配置され、この光源２からの光ビームBがミラーM1,M2,・・・またはMn に照射される。そして、円筒体１はモータ３によって、円筒軸を中心として一方向に一定速度で回転され、この円筒体１の回転により、光源２からの光ビームBの進行路に、ミラーM1,M2,・・・，Mn が順次に位置し、その各ミラーでの反射により光ビームBが２次元方向に走査される。

【００１６】ここで、以上のような構造の円筒体１は、例えば、樹脂を図１に示す円筒形状に成形し、その内周面の各面にアルミニウム膜を蒸着等により形成することによってミラーM1,M2,・・・，Mn を得る、といった方法で作製することができる。

【００１７】また、このような方法により複数枚のミラーM1,M2,・・・，Mn を簡単に作製することができるので、各ミラーの角度（仰角α及び方位角φ）の設定を自由に行うことが可能となる結果、広い走査角度を実現できる。さらに各ミラーの角度をそれぞれ独立して設定できるので、走査方法のバリエーションが広がるという利点もある。

【００１８】なお、図１の実施の形態では、円筒体１の内部に光源２を配置した例を示したが、このような光源２に替えて、各ミラーM1,M2,・・・，Mn からの反射光ビームを検出する受光器を円筒体１の内部に配置すれば、２次元の光度分布を測定する装置を構築することができる。また、そのような光源及び受光器の双方を円筒体１の内部に配置しておけば、バーコードリーダ等に利用できる走査光学装置を構築することができる。

【００１９】図３は本発明の赤外検出装置の実施の形態の一例を示す縦断面図、図４はその正面図である。また図５は図３の断面と直交する方向から見た側面図である。この例の赤外検出装置は、円筒体１１、赤外センサ１２、モータ１３、エンコーダ１４及びこれらを収容する遮光カバー１５によって主に構成されている。

【００２０】円筒体１１は、先の図１に示したものと同様な構造で、円筒内周面に多数（１００枚程度）のミラーM1,M2,・・・，Mn が配置されており、モータ１３によって一定回転（例えば６０ｒｐｍ）が与えられる。

【００２１】また、円筒体１１の内部には、視野レンズ１２ａをもつ赤外線センサ１２が、この円筒体１１の径方向に沿って配置されている。さらに遮光カバー１５の内部には、円筒体１１の回転量を検出するためのエンコーダ１４が配置されており、このエンコーダ１４及び赤外線センサ１２の各出力は信号処理回路１６に導かれる。なお、遮光カバー１５には、ミラーM1,M2,・・・，またはMn と対向する位置に視野窓１５ａが開口されている。

【００２２】そして、この例では、各ミラーM1,M2,・・・，Mn の角度（仰角α及び方位角φ：図２参照）を、その各ミラーとレンズが臨む視野（θx,θy）が、図６に示すような、マトリクス状（１０×１０）に分割された検知エリアＡの各領域Ｆ・・Ｆに対応するように設定し、円筒体１１の回転により、その各領域Ｆ・・Ｆからの赤外線が赤外線センサ１２に順次に入射するように構成しており、その赤外線センサ１２の出力信号と、エンコーダ１４の出力信号すなわち検知エリアＡからの赤外線ビームの位置情報から、検知エリアＡからの赤外光の強度分布を信号処理回路１６で求めて、２次元分布情報をモニタ装置（図示せず）等に出力する。

【００２３】なお、信号処理回路１６は、遮光カバー１５に内蔵しておいてもよいし、装置の外部機器等に設けておいてもよい。ここで、この実施の形態の赤外検出装置は、劇場や集会場等において人の分布を調べる機器のほか、最近、ホームヘルパの分野で注目されているシステム、例えば一人暮らしの老人が元気な状態で生活をしているかどうかをモニタするためのシステムにも利用することができる。また、このような人体位置（動き）の検知のほか、簡単な赤外画像を得る装置にも適用可能である。

【００２４】

【発明の効果】以上説明したように、本発明の走査光学装置によれば、内周面に複数枚のミラーを配置した円筒体を回転させて光ビームの走査を行うように構成しているので、光源等を配置するスペースを円筒体の外側に設ける必要がなく、装置全体の小型化をはかることができる。また、円筒体を一方向に一定速度で回転させる１箇の回転機構で、目的とするビーム走査を行うことができるので、駆動系の構造及び制御が簡単となり、装置コストの低減化をはかることができる。

【００２５】本発明の赤外検出装置は、上記した特徴をもつ円筒体を用いて赤外線の２次元強度分布を測定する構造としたから、装置構造が簡単でコストが安くて済む。

【図面の簡単な説明】

【図１】本発明の走査光学装置の実施の形態の一例を模式的に示す斜視図

【図２】その実施の形態に適用するミラーの仰角αと方位角φの関係を示す図

【図３】本発明の赤外検出装置の実施の形態の一例を示す縦断面図

【図４】その実施の形態の正面図

【図５】図３の断面と直交する方向から見た側面図

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【図６】検知エリアＡの例を示す図

【符号の説明】

１、１１　円筒体

M1,M2,……, Mn ミラー

２　光源

３　モータ

＊１２　赤外線センサ

１３　モータ

１４　エンコーダ

１５　遮光カバー

１６　信号処理回路

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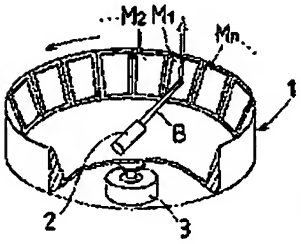
【図１】



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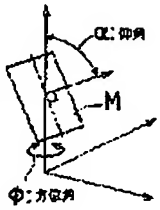

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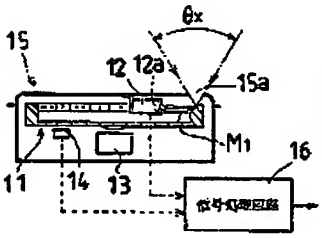

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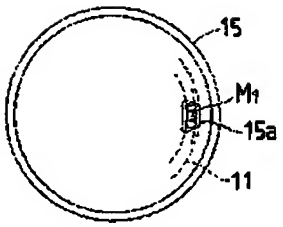

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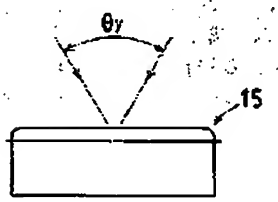

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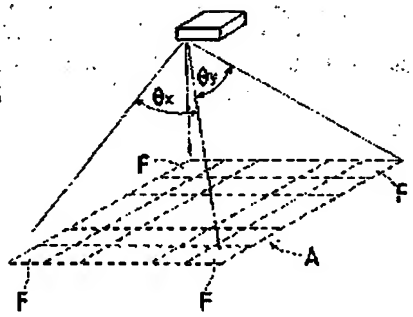

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the infrared detection equipment used for the scan optical equipment used for the optical system of the lighting for a bar code reader, a laser scanner, a laser beam printer, and amusement facilities etc., body detection, etc.
[0002]
[Description of the Prior Art] As optical system which scans a light beam in the shape of two-dimensional, a galvanomirror (oscillating mirror) and a polygon mirror are mentioned. The polygon mirror is widely used for the bar code reader, the laser beam printer, etc. among these scan optical system, and since a galvanomirror can scan the configuration of arbitration by control of an axis-of-rotation drive system, it is used also for fields, such as lighting for amusement using a laser beam.
[0003] On the other hand, as infrared detection equipment used for body detection etc., there is equipment which detects the infrared light out of detection area by the infrared sensor, and measures two-dimensional luminous-intensity distribution.
[0004]
[Problem(s) to be Solved by the Invention] By the way, since a biaxial drive system is needed when performing a two-dimensional scan in a galvanomirror, there is a problem of also attaching cost highly, the top where the whole optical system is large-scale. And since it is necessary to take the biaxial synchronization of a mirror correctly and to control the scan angle of a beam to a precision in order to obtain the target beam scan, the motor and controller of high degree of accuracy are needed.
[0005] Moreover, it is necessary to arrange the light source or an electric eye on the outside of a rotation polyhedron, and in the case of a polygon mirror, for this reason, the space which arranges the light source etc. other than a rotation polyhedron is needed, and there is a problem that optical system surely becomes large.
[0006] When the thing of the structure of on the other hand preparing an infrared sensor, a field lens, etc. conventionally as infrared detection equipment which detects the location of the body etc. corresponding to the number of partitions of detection area is common and the number of partitions of detection area increases for this reason, the number of the sensor needed in connection with it and a lens also increases, and there is a problem that costs become high.
[0007] In addition, although the method of using a polygon mirror for the scan in detection area is also considered in this kind of infrared detection equipment Since it is usually necessary to arrange a mirror peripheral face towards the direction where detection light advances in the case of a polygon mirror, in order to install in a ceiling etc. as an object for body detection the mirror axis of rotation is leveled and a mirror is arranged with a perpendicular posture -- if it kicks, it will not become, but for this reason, the height size of equipment becomes quite large, and it becomes less practical
[0008] This invention was made in view of the above actual condition, and the structure and control of a drive system aim [this invention] at offer of scan optical equipment easy and small moreover, and offer of the cheap infrared detection equipment which can measure two-dimensional luminous-intensity distribution on the basis of an easy configuration.
[0009]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, scan optical equipment of this invention An internal surface is met so that it may illustrate to drawing 1 , and they are two or more mirrors M1 and M2, ..., Mn. The cylinder object 1 arranged so that it may be suitable in the direction in which each of those reflectors differ mutually, A rolling mechanism which supports this cylinder object 1 and rotates a cylinder shaft as a center (for example, motor 3), They are mirrors M1 and M2, ..., or Mn about light beam B from the light source 2 which was equipped with the light source 2 arranged inside the cylinder object 1, was made to rotate the cylinder object 1 of the above-mentioned structure, and has been arranged inside the cylinder object 1. By glaring It characterizes by having constituted so that light beam B might be scanned in the shape of two-dimensional.
[0010] Thus, by arranging a mirror for a scan to inner skin of the cylinder object 1, it becomes unnecessary to provide for an outside of body of revolution a space which arranges the light source etc., and only the part can achieve a miniaturization of optical equipment. Moreover, when a dimension of optical equipment is made into the same magnitude as scan optical system using the conventional general polygon mirror, it enables it only for a part equivalent to a space which arranges the light source etc. to be able to take a large diameter of the cylinder object 1, and to make [many] the number of pages of reflectors compared with a case where a polygon mirror is used.
[0011] Here, in scan optical equipment of this invention, it may change to the above-mentioned light source 2, an electric eye may be arranged inside the cylinder object 1, and it becomes possible to measure two-dimensional luminous-intensity

distribution in this case. Moreover, what is necessary is just to station both sides of the electric eye for the light sources (semiconductor laser etc.) inside the cylinder object 1, in applying scan optical equipment of this invention to a bar code reader etc.

[0012] Infrared detection equipment of this invention arranges an infrared sensor 12 inside the cylinder object 11, and the feature is in a place constituted so that intensity distribution of infrared light from the target detection area (refer to drawing 6) might be measured so that it may have an above-mentioned cylinder object and an above-mentioned rolling mechanism of structure and may illustrate to drawing 3 .

[0013]

[Embodiment of the Invention] The gestalt of operation of this invention is hereafter explained based on a drawing. Drawing 1 is the perspective diagram showing typically the gestalt of operation of the scan optical equipment of this invention.

[0014] The scan optical equipment of this example is mainly constituted by the cylinder object 1, the light source 2, and the motor 3. Inner skin is processed into the configuration where it inclined aslant to the cylinder shaft, the inner skin is met, and the cylinder object 1 is two or more mirrors M1 and M2, ..., Mn. It is prepared. Each of these mirrors M1 and M2, ..., Mn The reflector is formed so that the elevation angle alpha shown in drawing 2 may differ from Azimuth phi a predetermined angle every mutually, respectively.

[0015] For the light source 2, it is arranged inside the cylinder object 1 and light beam B from this light source 2 is mirrors M1 and M2, ..., or Mn. It glares. And the cylinder object 1 rotates with constant speed to an one direction centering on a cylinder shaft by the motor 3, and is mirrors M1 and M2, ..., Mn to the advance way of light beam B from the light source 2 by rotation of this cylinder object 1. It is located one by one and light beam B is scanned in the two-dimensional direction by reflection by each of that mirror.

[0016] Here, the above cylinder objects 1 of structure are mirrors M1 and M2, ..., Mn by fabricating in the shape of [which shows resin to drawing 1] a cylindrical shape, and forming an aluminum film in each side of the inner skin by vacuum evaporationo etc. It is producible by the method of obtaining.

[0017] Moreover, they are two or more mirrors M1 and M2, ..., Mn by such method. Since it is easily producible, as a result of becoming possible to set up the angle (the elevation angle alpha and Azimuth phi) of each mirror freely, a large scan angle is realizable. Since the angle of each mirror can furthermore be set up independently, respectively, there is also an advantage that the variation of a scan method spreads.

[0018] in addition -- although the gestalt of operation of drawing 1 showed the example which has arranged the light source 2 inside the cylinder object 1 -- such the light source 2 -- changing -- each mirrors M1 and M2, ..., Mn from -- if the electric eye which detects a reflected light beam is arranged inside the cylinder object 1, the equipment which measures two-dimensional luminous-intensity distribution can be built. Moreover, if the both sides of such the light source and an electric eye are stationed inside the cylinder object 1, the scan optical equipment which can be used for a bar code reader etc. can be built.

[0019] The drawing of longitudinal section in which drawing 3 shows an example of the gestalt of operation of the infrared detection equipment of this invention, and drawing 4 are the front view. Moreover, drawing 5 is the side elevation seen from the direction which intersects perpendicularly with the cross section of drawing 3 . The infrared detection equipment of this example is mainly constituted by the protection-from-light covering 15 which holds the cylinder object 11, the infrared sensor 12, a motor 13, an encoder 14, and these.

[0020] The cylinder object 11 is the same structure as what was shown in previous drawing 1 , and is many (about 100 sheets) mirrors M1 and M2, ..., Mn to cylinder inner skin. It is arranged and fixed rotation (for example, 60rpm) is given by the motor 13.

[0021] Moreover, the infrared sensor 12 which has field lens 12a in the interior of the cylinder object 11 is arranged along the direction of a path of this cylinder object 11. Furthermore, the encoder 14 for detecting the rotation of the cylinder object 11 is arranged, and each output of this encoder 14 and an infrared sensor 12 is led to the interior of the protection-from-light covering 15 at a digital disposal circuit 16. In addition, in the protection-from-light covering 15, they are mirrors M1 and M2.... Or Mn The opening of the visual field aperture 15a is carried out to the location which counters.

[0022] And at this example, they are each mirrors M1 and M2, ..., Mn. An angle (the elevation angle alpha and Azimuth phi: refer to drawing 2) It sets up so that it may correspond to each field F..F of the detection area A where the visual field (theta x and thetay) which the each mirror and lens face was divided in the shape of [as shown in drawing 6] a matrix (10x10). By rotation of the cylinder object 11 It constitutes so that the infrared radiation from each of that field F..F may carry out incidence to an infrared sensor 12 one by one. The output signal of the infrared sensor 12, From the positional information of the infrared beam from the output signal A, i.e., the detection area, of an encoder 14, the intensity distribution of the infrared light from the detection area A are searched for by the digital disposal circuit 16, and two-dimensional distribution information is outputted to a monitoring device (not shown) etc.

[0023] In addition, a digital disposal circuit 16 may be built in the protection-from-light covering 15, and may be prepared in the external instrument of equipment etc. Here, the infrared detection equipment of the gestalt of this operation can be used also for the system for carrying out the monitor of whether the system which attracts attention in the field of the home helper, for example, an old man living alone, lives on the fine condition recently besides [which investigates distribution of people in a theater, a meeting field, etc.] a device. Moreover, it is applicable also to the equipment which obtains an easy infrared image besides detection of such a body location (motion).

[0024]

[Effect of the Invention] Since it constitutes according to the scan optical equipment of this invention so that the cylinder object which has arranged two or more mirrors to inner skin may be rotated and a light beam may be scanned as explained

above, it is not necessary to provide for the outside of a cylinder object the space which arranges the light source etc., and the miniaturization of the whole equipment can be achieved. Moreover, by the rolling mechanism of one shaft which makes an one direction rotate a cylinder object with constant speed, since the beam scan made into the purpose can be performed, the structure of a drive system and control become easy, and reduction-ization of equipment cost can be achieved.
[0025] Since it considered as the structure which measures infrared two-dimensional intensity distribution using a cylinder object with the above-mentioned feature, the infrared detection equipment of this invention is simple for equipment structure, and its cost is cheap and it ends.

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CLAIMS

[Claim(s)]
[Claim 1] The scan optical equipment with which it comes to be arranged either or the both sides of an electric eye which receives the light source which is equipped with a rolling mechanism which supports a cylinder object arranged so that two or more mirrors may be suitable in the direction in which each of those reflectors differ mutually along with an internal surface, and this cylinder object, and rotates a cylinder shaft as a center, and irradiates light inside that cylinder object at the above-mentioned mirror, or the reflected light from a mirror.
[Claim 2] Infrared detection equipment which is constituted and becomes so that the above-mentioned sensor may detect infrared light out of detection area which is equipped with an infrared sensor arranged a cylinder object and a rolling mechanism according to claim 1, and inside the cylinder object, and each mirror overlooks when the above-mentioned cylinder object is in a rotation condition.

[Translation done.]